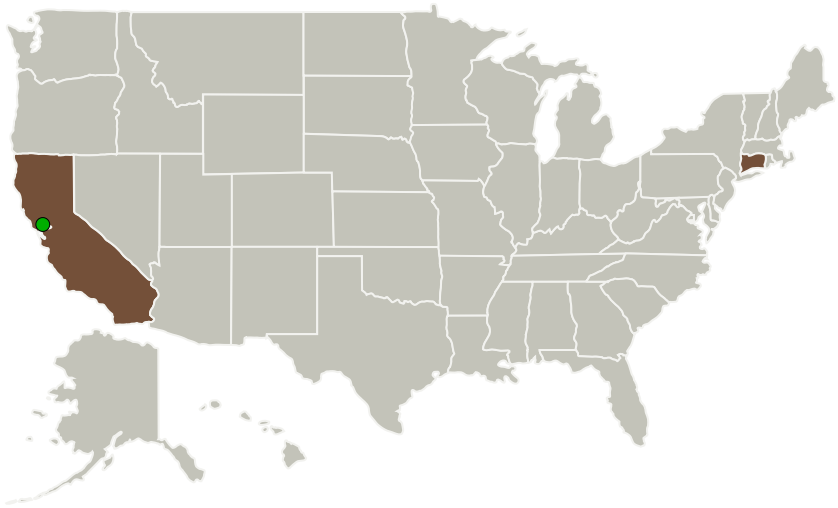
Automation of Health Management, Troubleshooting and Recovery in Lunar Outpost, Phase I

Completed Technology Project (2010 - 2010)

Project Introduction

NASA's Lunar and other future extraterrestrial outposts will be built for long duration missions that are likely to experience significant number of faults and degradations over its lifetime. Additionally, these systems will have a highly reconfigurable architecture and perform multimodal operation. Being a resource constrained environment, health management, troubleshooting, maintenance, and repair of the Lunar outpost poses formidable challenge. To address this challenge Qualtech Systems, Inc. proposes to automate a major part of the HM and recovery decision support systems through a TEAMS-based approach. The approach will provide the facility to develop on-the-fly reconfigurable diagnostic models that can be used to automatically update a TEAMS model upon configuration changes. Residual functional capability estimation techniques and automatic updating of diagnostic models based on current condition of components will be developed through this effort. Dynamic multiple fault diagnosis techniques will be used for enhancing the diagnostic accuracy obtained from TEAMS-based diagnosis. Such accuracy enhancement will greatly reduce the amount of human intervention required in troubleshooting of spurious faults, and faults that are isolated with a large ambiguity group. On the overall, the proposed effort will provide a solution for automating the HM related activities in highly reconfigurable systems with resource constraints.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Qualtech Systems, Inc.	Lead Organization	Industry Minority-Owned Business, Small Disadvantaged Business (SDB)	Rocky Hill, Connecticut
Ames Research Center(ARC)	Supporting Organization	NASA Center	Moffett Field, California

Primary U.S. Work Locations	
California	Connecticut

Project Transitions

January 2010: Project Start

July 2010: Closed out

Closeout Summary: Automation of Health Management, Troubleshooting and Recovery in Lunar Outpost, Phase I Project Image

Closeout Documentation:

- Final Summary Chart Image*(https://techport.nasa.gov/file/140057)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Qualtech Systems, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Sudipto Ghoshal

Co-Investigator:

Sudipto Ghoshal

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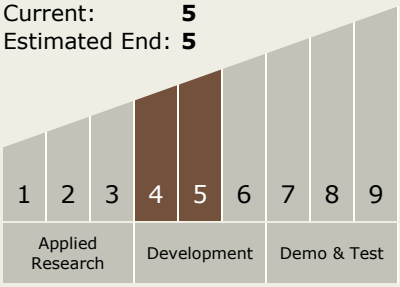
Completed Technology Project (2010 - 2010)

Technology Maturity (TRL)

Start: **4**
Current: **5**
Estimated End: **5**



Technology Areas

Primary:

- TX17 Guidance, Navigation, and Control (GN&C)
  - TX17.2 Navigation Technologies
    - TX17.2.3 Navigation Sensors

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System